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REMARKS

This amendment is intended as a full and complete response to the non-final Office Action mailed June 18, 2004. In the Office Action, the Examiner notes that claims 1-21 are pending, of which claims 1-21 stand rejected. By this amendment, claims 1, 3, 7, 9-12 and 15 have been amended, claim 2 has been canceled, and claims 4-6, 8, 13-14, and 16-21 continue unamended.

In view of both the amendments presented above and the following discussion, the Applicant submits that none of the claims now pending in the application are non-enabling, anticipated or obvious under the provisions of 35 U.S.C. §112, §102 or §103. Thus, the Applicant believes that all of these claims are now in allowable form.

It is to be understood that the Applicant, by amending the claims, does not acquiesce to the Examiner's characterizations of the art of record or to Applicant's subject matter recited in the pending claims. Further, Applicant is not acquiescing to the Examiner's statements as to the applicability of the art of record to the pending claims by filing the instant responsive amendments.

Objections

The Claims

The Examiner has objected to claim 9 under 37 C.F.R. §1.75 as being a substantial duplicate of claim 7. Applicant respectfully traverses the Examiner's objection. In particular, the Applicant has amended both claims 7 and 9 to specifically clarify the type of memory storage devices on which data is stored. In claim 7, the Applicant amended the claim to recite that the session-state data is stored on at least one non-volatile storage device. Alternatively, in claim 9, the Applicant has amended claim 9 to claim the feature that the session-stage data is stored on a volatile memory device.

As such, the Applicant submits that claims 7 and 9, as amended, are not duplicate claims or else are so close in content that they both cover the same thing. Rather, the Applicant submits that claims 7 and 9, as amended, are clearly distinguished from one another, since there are some instances where it is preferable to store session-state data on volatile memory storage devices, as opposed to storing

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session-state data on non-volatile memory storage devices. Therefore, the Applicant respectfully requests that the rejection be withdrawn.

Rejections under 35 U.S.C. §112

The Examiner has rejected claims 3-6 under 35 U.S.C. §112, ¶2. Applicant respectfully traverses the Examiner's rejection.

The Examiner states that "Claim 3 contradicts the base claim of Claim 2 in that the same managing module (from claim 2) in claim 3 is both 'distributed' and 'non-distributed' simultaneously. Claim 4 also claims that same managing module is both 'distributed' and 'non-distributed' simultaneously." The Applicant respectfully traverses the rejection.

Applicant has amended claims 3 and 4 to eliminate the contradiction and to reflect the corresponding apparatus claim of claim 15 (as suggested by the Examiner). In view of the amendment of claims 3 and 4, Applicant submits that the Examiner's rejection is moot and respectfully requests that it be withdrawn.

Rejections under 35 U.S.C. §103

Claims 1-5

The Examiner has rejected claim 1 as being unpatentable over Duso et al. (5,892,915, hereinafter "Duso"), in view of Craig (5,790,176, hereinafter "Craig"). Applicant respectfully traverses the rejection.

The Applicant has amended claim 1 to include the features of dependent claim 2. Specifically, Applicant's claim 1, as amended, recites:

"A method of distributing and sharing processing loads and increasing fault tolerance between provider equipment and subscriber equipment of an interactive information distribution system, comprising the steps of:
receiving, at a head-end, a request for video information from said subscriber equipment;
executing a video session from at least one of a plurality of managing modules on a primary head-end controller at said head-end;
dedicating, at said head-end, at least one secondary head-end controller respectively having said at least one managing module as a resource for executing said video session, wherein said executing said video session comprises concurrently executing said video session on at least one

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distributed managing module associated with each of said primary head-end controller and said at least one secondary head-end controller;
storing session-state data from said executed video session on at least one storage device; and
streaming, from a stream server, said video information to said requesting subscriber equipment during a normal mode of operation."

The test under 35 U.S.C. §103 is not whether an improvement or a use set forth in a patent would have been obvious or non-obvious; rather the test is whether the claimed invention, considered as a whole, would have been obvious. Jones v. Hardy, 110 U.S.P.Q. 1021, 1024 (Fed. Cir. 1984) (emphasis added). To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974). All words in a claim must be considered in judging the patentability of that claim against the prior art. *In re Wilson*, 424 F.2d 1382, 1385, 165 U.S.P.Q. 494 496 (C.C.P.A. 1970), M.P.E.P. 2143.03. Moreover, the invention as a whole is not restricted to the specific subject matter claimed, but also embraces its properties and the problem it solves. *In re Wright*, 6 U.S.P.Q. 2d 1959, 1961 (Fed. Cir. 1988) (emphasis added). The combination of Duso and Craig fails to teach or suggest the Applicant's invention as a whole.

In particular, Duso discloses "[t]he clustering of the stream servers 21 as a front end to the cached disk array 23 provides parallelism and scalability." (See Duso, column 5, lines 48-39.) "Each of the dual redundant controller servers 28, 29 has an Ethernet connection to the local Ethernet link 26. Each of the controller servers 28, 29 also has a connection to a serial link 31 to a media server display and keyboard 32. The controller servers 28, 29 run a conventional operating system (such as Windows NT or UNIX) to provide a hot-failover redundant configuration." "The active one of the controller servers 28, 29 also allows management and control of the server resources from the network using standard protocols, such as the Simple Network Management Protocol (SNMP)." (See Duso, column 5, lines 48 and 49, column 6, lines 28-40.)

Furthermore, the Craig reference discloses:

"Session Manger 310 Include Session Supervisor 312 which manages all program sessions including system access by Video-on-Demand subscribers, other multi-media users and input and output to, from and

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through the Media server by Multi-Media Information Providers. Session Supervisor 312 tracks and records all data pertinent to each session including output port, input port (if receiving data directly from a Multi-Media Information Provider or if the user is a Multi-Media Information Provider), feature being played or multi-media application address, feature index data, feature frame data, and session condition." (See Craig, column 10, lines 46-56.)

Craig further discloses: "Session Supervisor 312 maintains a matrix of routing information for each session, including what users are assigned to a given output port, and the source of the input data." "This data is provided to the Session Registers 316 for tracking frames for each logical subscriber session and is used to restart an interrupted session." (See Craig, column 14, lines 7-15.)

Moreover, the Nelson reference discloses:

"According to principles of the present invention in its preferred embodiment, a disk storage control system includes dual controllers having real-time, synchronous, mirrored memory therebetween to provide immediate, accurate, and reliable failover in the event of failure of one controller or its memory. Non-volatile random access memory provides retention of data during the loss of power and during the manipulation of hardware for purposes of repair of a controller. A communication path is established within the mirrored memory between the controllers to monitor and coordinate their activities. The state of the mirrored memory is continuously monitored for accuracy of the mirror and failure detection." (See Nelson, Column 1, lines 52-64.)

Even if the three references somehow could be operably combined, the combination would disclose an Interactive Information distribution system having data controllers that provide hot-failover redundancy between provider equipment and subscriber equipment, a session manager for tracking and recording all data pertinent to each session, and a disk storage control system having dual controllers wherein data in one memory of first disk controller is duplicated in the memory of a second disk controller. Thus, the combined references are completely different from the Applicant's invention, since the combined references fail to teach or suggest that the execution of a video session comprises concurrently executing the video session on at least one distributed managing module associated with each said primary head-end controller and at least one secondary head-end controller. That is, the distributed managing

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module of the Applicant's invention executes the video session, as opposed to merely storing the data in memory of each head-end controller.

Specifically,

"Each managing module has a distinct function for managing and processing specific data at different times. For example, a portion of the managing modules are dedicated to processing session-state data, that is generated during the subscriber's requests for video content. Other managing modules manage video asset allocation and storage at either the head-end or some other remote location. Still, others manage the subscriber equipment and billing requirements.

This method of improving the fault-tolerance, that is, by adding redundant hardware at the head-end, has an additional feature that provides for the sharing of the processing loads prior to storing the processed data. Specifically, some of the managing modules have the ability to process data on more than one head-end controller at a time. These managing modules are termed 'distributed,' since each instance of the managing module is processing a subset of the session-state data. Session-state data that is processed by a distributed managing module is concurrently being processed at the primary head-end controller processor 135-1 and processed at the secondary head-end controller processor 135-2." (See Applicant's specification, page 9, line 27 to page 10, line 11.)

Accordingly, the combination of Duso, Craig and Nelson fails to teach or suggest the Applicant's invention as a whole, since the combined references fail to teach or suggest the Applicant's claimed feature of "said executing said video session comprises concurrently executing said video session on at least one distributed managing module associated with each of said primary head-end controller and said at least one second head-end controller." Therefore, the combination of Duso, Craig and Nelson fails to teach or suggest the Applicant's invention as a whole.

As such, the Applicant submits that claim 1 is not obvious and fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder. Furthermore, claims 2-5 depend, either directly or indirectly, from independent claim 1 and recite additional features thereof. As such, and for at least the same reasons as discussed above, the Applicant submits that these dependent claims are also not obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder. Therefore, the Applicant respectfully requests that the rejection of such claim under 35 U.S.C. §103(a) be withdrawn.

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Claim 6

The Examiner has rejected claim 6 as being unpatentable over Duso in view of Craig, in view of Nelson, in further view of Safadi (5,892,910, hereinafter "Safadi"). Applicant respectfully traverses the rejection.

Claim 6 is dependent indirectly upon claim 1 and directly upon claim 5 and recites similar features thereof. The teachings of Duso, Craig, and Nelson are discussed above with respect to claims 1-5.

Furthermore, Safadi fails to bridge the substantial gap as between Duso, Craig and Nelson and Applicant's invention. In particular, Safadi discloses:

"The network module 70, under the management of the network controller 62, forwards signalling from the STT 16 to the corresponding network controller 62 which forwards this information to the L1G 20 or to the VIP 12 through the backbone subnetwork 40. The network module 70 also communicates with the addressable controller 24 for access control and decryption/encryption authorization." (See Safadi, column 11, lines 11-17.)

Even if the four references could somehow be operably combined, the combination would merely disclose an interactive information distribution system having data controllers that provide hot-failover redundancy between provider equipment and subscriber equipment, a session manager for tracking and recording all data pertinent to each session, and a disk storage control system having dual controllers wherein data in one memory of first disk controller is duplicated in the memory of a second disk controller, and a network controller which forwards signal information from a set-top information to a level one gateway (L1G). Nowhere in the combined references is there any teaching or suggestion of the Applicant's claimed feature of "executing said video session comprises concurrently executing said video session on at least one distributed managing module associated each of said primary head-end controller and said at least one secondary head-end controller." Therefore, the combined references fail to teach or suggest the Applicant's invention as a whole.

As such, the Applicant submits that claim 6 is not obvious and fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder. Therefore, the Applicant

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respectfully requests that the rejection of such claim under 35 U.S.C. §103(a) be withdrawn.

Claims 7-10

The Examiner has rejected claims 7-10 as being unpatentable over Duso in view of Craig, in further view of Beal et al. (5,155,845, hereinafter "Beal"). Applicant respectfully traverses the rejection.

Claims 7-10 are dependent directly or indirectly upon claim 1 and recite similar features thereof. The teachings of Duso and Craig are discussed above with respect to claims 1-6. Furthermore, Beal fails to bridge the substantial gap as between Duso and Craig and Applicant's invention. In particular, Beal discloses:

"Both hosts 101 and 121 may operate concurrently and independently with each normally communicating only with its primary DSC and connected disk drives. Thus, host 101 may normally communicate primarily with DSC 105 and its disk drives 109 and host 121 may normally communicate primarily with DSC 107 and its disk drives 111. However, on each write operation by either host for volumes specified for extended dual copy service, the data record is written not only on the disk drives of the DSC with which the host normally communicates, but by means of data links 106, the other DSC causes an extended duplicate copy of each such record to be recorded on its disk drives." (See Beal, column 6, lines 51-64.)

Furthermore, even if the three references could somehow be operably combined, the combination would merely disclose an interactive information distribution system having dual redundant controllers for providing hot-failover redundancy between provider equipment and subscriber equipment, a session supervisor which tracks and records all data pertinent to each session and maintains routing information for each session, and upon a failure of disk drive and/or disk controller, and/or disk storage controller (DSC), a host may continue normal operation by communicating with another DSC over an interface to operate with standard duplicate records on the disk drive. Thus, the combined references are completely different from the Applicant's invention, since the combined references fail to teach or suggest "executing said video session comprises concurrently executing said video session on at least one distributed managing module associated with each of said primary head-end controller and said at

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least one secondary head-end controller." Therefore, the combination of Duso, Craig and Beal fails to teach or suggest the Applicant's invention as a whole.

As such, the Applicant submits that claims 7-10 are not obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder. Therefore, the Applicant respectfully requests that the rejection of such claim under 35 U.S.C. §103(a) be withdrawn.

Claim 11

The Examiner has rejected claim 11 as being unpatentable over Duso, in view of Safadi. Applicant respectfully traverses the rejection.

Applicant's claim 11 recites

"In an interactive video distribution system including information provider equipment and subscriber equipment, apparatus comprising:
a stream server;
a plurality of head-end controllers, coupled to said stream server, for managing a video session at a head-end, each head-end controller comprising a plurality of managing modules for executing said video session, wherein at least one of said managing modules processes session-stage data of said video session through both primary head-end controller and said at least one secondary head-end controller; and
a plurality of access controllers, coupled to said plurality of head-end controllers, for interacting with said subscriber equipment during said video session to responsively provide video information to said subscriber equipment upon a request for video information from said subscriber equipment."

The combination of Duso and Safadi fails to teach or suggest the Applicant's invention as a whole.

In particular, as discussed above Duso discloses: "[T]he clustering of the stream servers 21 as a front end to the cached disk array 23 provides parallelism and scalability." (See Duso, column 5, lines 48-39.) "Each of the dual redundant controller servers 28, 29 has an Ethernet connection to the local Ethernet link 26. Each of the controller servers 28, 29 also has a connection to a serial link 31 to a media server display and keyboard 32. The controller servers 28, 29 run a conventional operating system (such as Windows NT or UNIX) to provide a hot-fallover redundant configuration." "The active one of the controller servers 28, 29 also allows

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management and control of the server resources from the network using standard protocols, such as the Simple Network Management Protocol (SNMP)." (See Duso, column 5, lines 48 and 49, column 6, lines 28-40.)

Furthermore, Safadi fails to bridge the substantial gap as between Duso and the Applicant's invention. In particular, as discussed above, Safadi discloses:

"The network module 70, under the management of the network controller 62, forwards signaling from the STT 16 to the corresponding network controller 62 which forwards this information to the L1G 20 or to the VIP 12 through the backbone subnetwork 40." (See Safadi, column 11, lines 11-15.)

Even if the two references could somehow be operably combined, the combination would merely disclose an interactive information distribution system having dual controllers to provide hot-failover redundancy between provider equipment and subscriber equipment, and a network module under the management of a network controller that forwards signaling from the set-top terminal to the corresponding network controller which forwards this information to the L1G or to the video information providers (VIT) through a backbone subnetwork. Nowhere in the combined references is there any teaching or suggestion of "each head-end controller comprising a plurality of managing modules for executing said video session, wherein at least one of said managing modules processes session-stage data of said video session through both primary head-end controller and said at least one secondary head-end controller." Therefore, the combination of Duso and Safadi fails to teach or suggest the Applicant's invention as a whole.

As such, the Applicant submits that claim 11 is not obvious and fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder. Therefore, the Applicant respectfully requests that the rejection of such claim under 35 U.S.C. §103(a) be withdrawn.

Claims 12-14

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The Examiner has rejected claims 12-14 as being unpatentable over Duso in view of Armstrong et al. (6,604,224), in view of Shrader et al. (6,230,240), in view of Safadi, and in further view of Craig. Applicant respectfully traverses the rejection. Claims 12-14 are dependent directly or indirectly upon claim 11 and recite similar features thereof. For example, claim 12 (and similarly claims 13 and 14) recites in part:

"In an interactive video distribution system including information provider equipment and subscriber equipment, apparatus comprising:
a stream server;
a plurality of head-end controllers, coupled to said stream server, for managing a video session at a head-end, each head-end controller comprising a plurality of managing modules for executing said video session, wherein at least one of said managing modules processes session-stage data of said video session through both primary head-end controller and said at least one secondary head-end controller; and
a plurality of access controllers, coupled to said plurality of head-end controllers, for interacting with said subscriber equipment during said video session to responsively provide video information to said subscriber equipment upon a request for video information from said subscriber equipment." (emphasis added)

In particular, the Duso reference discloses the processors of controller servers 28 and 29 include a general purpose operating system such as Microsoft NP, and a network client communicates service requests to the video file server only through the software application executing on an active one of the controller servers 28 and 29. The application software running on an active one of the controller servers 28, 29 includes an admission control program. The kernel program 63 includes a real-time scheduler. The admission control program running on the active one of the controller servers 28, 29 applies an admission control policy to determine whether a service request can be satisfied, and if so, sends the stream servers 21 appropriate control messages that invoke their real-time schedulers to schedule operations to satisfy the service request. (See Duso, column 8, lines 27-32 and lines 48-56).

The Safadi reference discloses:

"The network module 70, under the management of the network controller 62, forwards signaling from the STT 16 to the corresponding network controller 62 which forwards this information to the L1G 20 or to the VIP 12 through the backbone subnetwork 40." (See Safadi, column 11, lines 11-15.)

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The Craig reference discloses a session manager that includes a Session Supervisor which manages all program sessions including system access by Video-On-Demand subscribers, other multi-media users and input and output to, from and through the media server by Multi-Media Information Providers. Session supervisor 312 tracks and records all data pertinent to each session including output port, input port (if receiving data directly from a Multi-Media Information Provider or if the user is a Multi-Media Information Provider), feature being played or multi-media application address, feature index data, feature frame data, and session condition. (See Craig, column 13, lines 46-56.)

Regarding the Armstrong and Shrader references, the Applicant notes that the Examiner has inadvertently failed to specifically point out how either of these two references teach or suggest particular features of the Applicant's invention. The Applicant respectfully requests the Examiner to specifically point out the disclosure in these references that is being used to teach or suggest the claimed features of the Applicant's invention.

To further advance the prosecution of the Applicant's application, the Applicant notes that the Armstrong reference merely discloses:

"The service provider equipment 102 comprises a content source 128, an information server 125, a session controller 145 and a transport processor 150. Briefly, the session controller 145, in response to a request(s) from subscriber equipment 106, causes the requested content to be retrieved from the information server 125 and provided to the transport processor 150. The transport processor 150 combines or multiplexes the retrieved content to provide an output data stream for the requesting subscriber(s). The output data stream is conditioned for transport to the requested subscriber via a forward application transport channel (FATC) 199 within the communications distribution network 104. (See Armstrong, column 3, lines 27-39.)

Furthermore, the Shrader reference discloses:

"This invention provides a mirrored memory disk array controller that enables a consistent, coherent memory image of the data storage space to all processors across hot-plug interfaces. To host processes seeking to read or write data, the memory image looks the same across the hot-plug interfaces." (See Shrader, column 2, lines 45-51.)

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Even if these five references could somehow be operably combined, the combined references would disclose an interactive information distribution system having dual controllers for storing mirrored data on memory associated with each of the controllers and an application software running on an active one of the controller servers, which includes an admission control program and a kernel program that includes a real-time program scheduler. The admission control program running on the active one of the controller servers applies an admission control policy to determine whether a service request can be satisfied and if so sends the stream servers appropriate control messages that invoke their real-time schedulers to schedule operations to satisfy the service request. Nowhere in the combination of the five cited references is there any teaching or suggestion of "each head-end controller comprising a plurality of managing modules for executing said video session, wherein at least one of said managing modules processes session-stage data of said video session through both primary head-end controller and said at least one secondary head-end controller."

The Applicant's invention is completely different from the teachings of the cited references. Specifically, the combined teachings disclose application software operating on one of the controllers that schedules a service request. The Applicant disagrees that scheduling a service request is equivalent to executing a video session. By adding redundant hardware at the head-end, an additional feature provides for the sharing of the processing loads prior to storing the processed data. Specifically, some of the managing modules have the ability to process data on more than one head-end controller at a time. These managing modules are termed "distributed," since each instance of the managing module is processing a subset of the session-state data. Session-state data that is processed by a distributed managing module is concurrently being processed at the primary head-end controller processor and processed at the secondary head-end controller processor (See Applicant's specification, page 10, lines 3-11).

Moreover, the combined teachings of the references disclose that the application software that includes an admission control program and a real-time scheduler runs on an active controller (i.e., a single controller), as opposed to both controllers executing a video session. Therefore, since the combined references fail to teach or suggest "each

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head-end controller comprising a plurality of managing modules for executing said video selection, wherein at least one of said managing modules processes session-state data of said video session through both primary head-end controller and at least one secondary head-end controller," the combined references fail to teach or suggest the Applicant's invention as a whole.

Therefore, the combination of Duso, Armstrong, Shrader, Safadi, and Craig fails to teach or suggest the Applicant's invention as a whole.

As such, the Applicant submits that claims 12-14 are not obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder. Therefore, the Applicant respectfully requests that the rejection of such claims under 35 U.S.C. §103(a) be withdrawn.

Claims 15-21

The Examiner has rejected claims 15-21 as being unpatentable over Duso in view of Safadi, in view of Craig, in further view of Nelson. Applicant respectfully traverses the rejection.

Claims 15-21 are dependent either directly or indirectly upon independent claim 11 and recite additional features thereof. The combined references fail to teach or suggest the Applicant's claimed feature of "each head-end controller comprising a plurality of managing modules for executing said video session, wherein at least one of said managing modules processes session-state data through both primary head-end controller and said at least one secondary head-end controller." The combined teachings of Craig, Nelson, Safadi disclose an interactive information distribution system having dual controllers where mirrored data associated with one controller onto memory of another controller, and a software application that runs on one of the controllers that schedules session requests. As discussed above with respect to dependent claims 12-14, the Applicant submits that scheduling is not equivalent to executing a video session. Furthermore, the application software running on one of the controllers (the active controller) applies the emission control policy to determine whether a service request can be satisfied, and if so, sends the stream servers appropriate control messages that evoke their real-time schedulers to schedule

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operations to satisfy the service request. The combined teachings are completely different from the Applicant's invention, since only one of the controllers performs the admission control program and scheduling application for service request, as opposed to the Applicant's invention where "at least one of said managing modules processes session-state data of said video session through both primary head-end controller and said at least one secondary head-end controller." Therefore, the combined teachings of the cited references fail to teach or suggest the Applicant's invention as a whole.

As such, the Applicant submits that claims 15-21 are not obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder. Therefore, the Applicant respectfully requests that the rejection of such claim under 35 U.S.C. §103(a) be withdrawn.

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CONCLUSION

Thus, the Applicant submits that none of the claims, presently in the application, are non-enabling, anticipated or obvious under the provisions of 35 U.S.C. §112, §102 or §103. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring adverse final action in any of the claims now pending in the application, it is requested that the Examiner telephone Eamon J. Wall, Esq. or Steven M. Hertzberg, Esq. at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

Dated: 9/15/04



Eamon J. Wall
Registration No. 39,414
Attorney for Applicant

MOSER, PATTERSON & SHERIDAN, LLP
595 Shrewsbury Avenue, Suite 100
Shrewsbury, New Jersey 07702
Telephone: 732-530-9404
Facsimile: 732-530-9808